1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC) conducted a technical review of the Human Health Risk Assessment for the 903 Pad, Mound, and East Trenches Area, Operable Unit No. 2 (OU2), Technical Memorandum No. 6, Model Description for the Rocky Flats Plant (RFP). This document was prepared by the U.S. Department of Energy (DOE) in January 1993. PRC prepared this review for the U.S. Environmental Protection Agency (EPA) under contract number 68-W9-0009, Technical Enforcement Support (TES) 12, work assignment number C08055.

This technical review contains general and specific comments. The general comment addresses the overall scope of the document, while the specific comments address technical issues in individual sections. Specific comments are referenced by page and paragraph number or section number.

2.0 GENERAL COMMENT

1. Contaminant fate and transport processes that may occur at the boundary between the alluvial fate and transport model (MT3D) and the colluvial fate and transport model (ONED3) are not included. After ground water exits the Rocky Flats alluvium through surface seeps, the contaminants may volatilize at the surface or adsorb to surface or near-surface soils before entering the colluvium. Assumptions and calculations should be included to describe contaminant fate and transport processes that occur at the alluvium/ground surface/colluvium boundary. The results will be critical to the overall contaminant fate and transport model and should be included.

3.0 SPECIFIC COMMENTS

1. Page 1-5, Section 1.2.2. The discussion on site meteorology does not include ambient temperature conditions. Temperature influences both volatilization rates of organic compounds and atmospheric stability, therefore, a discussion of temperature would be appropriate and should be included. Additionally, annual potential free-water evaporation is quantified, but its relevance to the model selection is not discussed. The purpose of including this value in the analysis should be explained.

   Rationale: For completeness and clarity, this section should discuss site temperature conditions and explain the purpose of the annual potential free-water evaporation.

2. Pages 2-1 through 2-5. The exposure scenarios for current and future off-site residents should include ground water use, such as ingestion, inhalation of vapors and dermal contact, as well as external irradiation exposure. Ingestion of homegrown fruits, including surface deposition of particulates and plant uptake of contaminants, should be included in all residential scenarios. Ingestion of homegrown vegetables should include plant uptake of chemicals in soil for all residential scenarios. These pathways should be added to those presented in this section. Modeling for surface water, ground water, and air should provide point concentrations appropriate for estimating risks from these pathways (EPA 1989).

   Rationale: Several potential exposure pathways have been omitted and should be included in this section.

3. Page 3-5, Paragraph 4. This paragraph states that the computer model MT3D simulates the processes of advection, dispersion, sink and source mixing, and chemical reactions. This paragraph should also state whether the MT3D computer model will be used to model organic and metal (including radionuclide) contaminant migration. From this description, it is not clear that MT3D will be capable of modeling the movement of both organic and metal contaminants in ground water. This point should be clarified.

Rationale: Contamination of metals and organic compounds and radionuclides may be a major component of the ground-water contamination at OU2 and should be modeled.

4. Page 3-8, Paragraph 5. This paragraph discusses the selection of the computer model ONED3 for modeling contaminant fate and transport in the colluvium. This model assumes a homogeneous aquifer; however, the colluvium may be very heterogeneous. Possible heterogeneous conditions in the colluvium should be addressed.

Rationale: The geologic conditions to which the model will be applied and should include all possible conditions.

5. Pages 3-10 through 3-15, Section 3.5. The technical memorandum should include a procedure for calibrating the universal soil loss equation (USLE) model to actual field conditions. Without field calibration, the USLE model is potentially inaccurate.

Rationale: To obtain useful results, the USLE model must be calibrated with data derived from watershed monitoring.

6. Page 3-14, Section 3.5.2. This section should discuss what results are expected from the surface water model. To estimate human health risks, the upper 95th percentile concentration of the mean is required for each contaminant of concern. It is not clear whether these results can be obtained from the model described.

Rationale: The technical memorandum needs to discuss how the model will provide data that is required for the risk assessment.

7. Page 3-22, Section 3.7.2. One of the models selected for estimating pollutant concentrations is a conventional box model. Box models incorporate several assumptions that limit the useability of their results. Because of such limitations, the selection of the box model over alternative models should be justified, and assumptions and limitations of the model for this application should be addressed.

Rationale: The selection of this model should be justified.

4.0 REFERENCES

EPA, 1989a. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part A). Interim final. EPA/540/1-89/002. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.